NON-PROVISIONAL PATENT APPLICATION

INVENTOR: **JEFFREY D. LANIER**

TITLE: **OPHTHALMIC SURGICAL DRAPE SUPPORT**

BACKGROUND OF THE INVENTION

1. **Field of the Invention**

This invention relates generally to an ophthalmic surgical drape support and specifically to a drape support with a device to supply oxygen or air to and remove carbon dioxide from the patient.

2. **Description of the Prior Art**

For eye surgery, a local anesthetic is often used instead of general anesthesia. It is imperative that the patient remains motionless during the delicate surgical procedure to avoid unintentional damage to tissue. The patient, other than that portion of the body which is undergoing surgery, is covered by a drape to reduce the possibility of contamination. If the drape rests on the patient's face, it may cling to the nostrils and mouth during inhalation and hamper breathing. A patient who feels suffocated may thrash about to clear the drape.

One method to keep the drape clear of the nose and mouth is disclosed by Carpel in U.S. 4,465,066. Carpel teaches using a 'T'-shaped drape support which secures to each cheek and to the bridge of the nose with double-sided adhesive pads to keep the drape clear of the nose and mouth. However, a patient may suffer claustrophobia, anxiety or irritation by having the drape support in contact with the face.

Moreledge, in U.S. 4,223,669, addresses this problem with a drape support having a 'U'-shaped horizontal base which is placed beneath the patient's head, a vertical mast which rises above the patient's face, and a horizontal transverse member which extends from the top of the mast and passes above the patient's face to keep the drape clear of the nose and mouth.

While this apparatus relieves some of the patient's apprehension, the air underneath the impermeable drape may become hot and stale due to exhalation which adds to the claustrophobic conditions of having a drape over the face. A cannula inserted into the nasal passageway to provide fresh oxygen to the patient, can be uncomfortable and result in irritation to the nasal passageway.

Crook (U.S. 4,699,131) discloses a surgical drape support which keeps the drape off of the patient's nose and mouth. Crook teaches to supply oxygen into the tent formed above the patient's face by an independent hose, thus obviating the need for the nasal cannula. Brehm (U.S. 4,739,753) refines the concept by integrating an oxygen supply into the drape support. The drape support has a rigid base bracket which is positioned beneath the patient and holds a flexible conduit which fulfills the dual role of supplying the patient with fresh air and holding the drape off of the patient's lower face. While both of these methods accommodate an air or oxygen supply, neither provides for drawing off the exhaled CO_2-rich air. The CO_2, which accumulates under the drape may give rise to acidosis and hypertension. Simply allowing the four sides of the drape to remain loose is not always effective in venting the CO_2.

Glassman (U.S. 5,140,997) reveals an ophthalmological surgical drape with integral breathing tubes for supplying oxygen to the patient at the nostrils and removing exhaled CO_2-rich air. Because the breathing means are one with the drape, the drape is fitted directly to the patient's face. Covering the patient's entire face with a drape may still lead to claustrophobia, anxiety, apprehension or irritation.

3. **Identification of Objects of the Invention**

A primary object of the invention is to provide an ophthalmological surgical drape support which keeps the surgical drape clear of the patient's nostrils and mouth during eye surgery.

Another object of the invention is to provide a source of oxygen or fresh air to the patient for breathing without the use of a cannula.

Another object of the invention is to provide for removal of exhaled CO_2-rich air from underneath the surgical drape.

Another object of the invention is to provide a drape support which is easily manipulated by hand to allow use with the myriad sizes and shapes of patients.

SUMMARY OF THE INVENTION

The objects identified above, as well as other features and advantages of the invention are incorporated in an apparatus for supporting a surgical drape during eye surgery comprising a flexible supply tube and a flexible suction tube which is easily formed by hand to maintain a desired shape and which serves the dual role of supporting the surgical drape above the patient's nose and mouth and providing a breathing environment by supplying oxygen and by removing exhaled CO_2-rich air. One or more supply ports are located at the upper end of the supply tube, and one or more suction ports are located at the upper end of the suction tube. The lower ends of the supply and suction tubes are equipped with valves and coupled to an oxygen source and a suction source, respectively. A bracket is disposed beneath the patient and supports the tubes near their lower ends.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is described in detail hereinafter on the basis of the embodiments represented schematically in the accompanying figure, in which:

Figure 1 illustrates a patient draped to expose only an eye for surgery, the drape held away from the face by the drape support of this invention; and

Figure 2 illustrates an alternate embodiment of the invention with a loop at or near the base.

DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTION

Referring to Figure 1, the surgical drape support 1 uses a supply tube 10 and a suction tube 12 to suspend a surgical drape 14 above a patient's nostrils 16 and mouth 18 while allowing the surgeon unencumbered access to the patient's eye through drape aperture 20.

For manufacturing economy and ease of use, supply tube 10 and suction tube 12 may be made from a single piece of tubing containing a plug 22 to prevent direct communication between the supply 10 and suction 12 portions of the tubing.

One or more (preferably several) supply ports 24 are located at or near the upper end 23 of supply tube 10 for supplying oxygen or air to the patient. Similarly, one or more (preferably several) suction ports 26 are located at or near the upper end 25 of suction tube 12 for removing accumulated CO_2-rich exhaled air. The ports may consist simply of holes formed in the tubes 10,12 or may consist of nozzle assemblies.

Also located at the upper ends of the tubes are optional horizontal tabs 42, to which a clamp may be attached to secure the drape and hold it taut. Tabs 42 can also be used to secure other items, such as small containers, to the drape.

Supply tube 10 and suction tube 12 are attached near their lower ends 27, 29 respectively, to bracket 28 on its vertical fin 30. The horizontal base 32 of bracket 28 is disposed beneath a mattress on which the patient is lying. Bracket 28 provides support for surgical drape support 1.

Supply tube 10 at its lower end 33 is coupled to a supply valve 34, which in turn is coupled to an oxygen or air source 36. Likewise, suction tube 12 at its lower end 37 is coupled to a suction valve 38, which is in turn coupled to a suction source 40. The valves are for the convenience of the anesthesiologist and may be omitted in an alternative configuration.

Because the tubes must support the weight of the drape, they must be rigid, but be capable of being shaped. Malleable tubes allow the surgeon to easily manipulate surgical drape support 1 to accommodate variations in patient size and shape. In one embodiment, the tubes are formed from a single piece of soft copper tubing covered by a crosslinked fluoropolymer or polyolefin tubing, or similar material. Plug 22 is formed by blocking the tubing, and ports 24, 26 are made by drilling holes into the tubing on either side of plug 22. In another embodiment, the tubes are formed from a tandem series of commercially available ball and socket tubing links. Special purpose links are available, such as links with nozzles (to form ports 24,26) and valves (to form plug 22).

Figure 2 illustrates an alternate embodiment of the invention with a loop 50 at or near base 30. Loop 50 allows greater freedom in shaping and positioning drape support 1 over the patient.

While preferred embodiments of the invention have been illustrated in detail, it is apparent that modifications and adaptations of the preferred embodiments will occur to those skilled in the art. It is to be expressly understood that such modifications and adaptations are in the spirit and scope of the invention as set forth in the following claims: